

# Harpers Ferry National Historical Park

## Natural Resource Condition Assessment Brief

National Park Service  
U.S. Department of the Interior

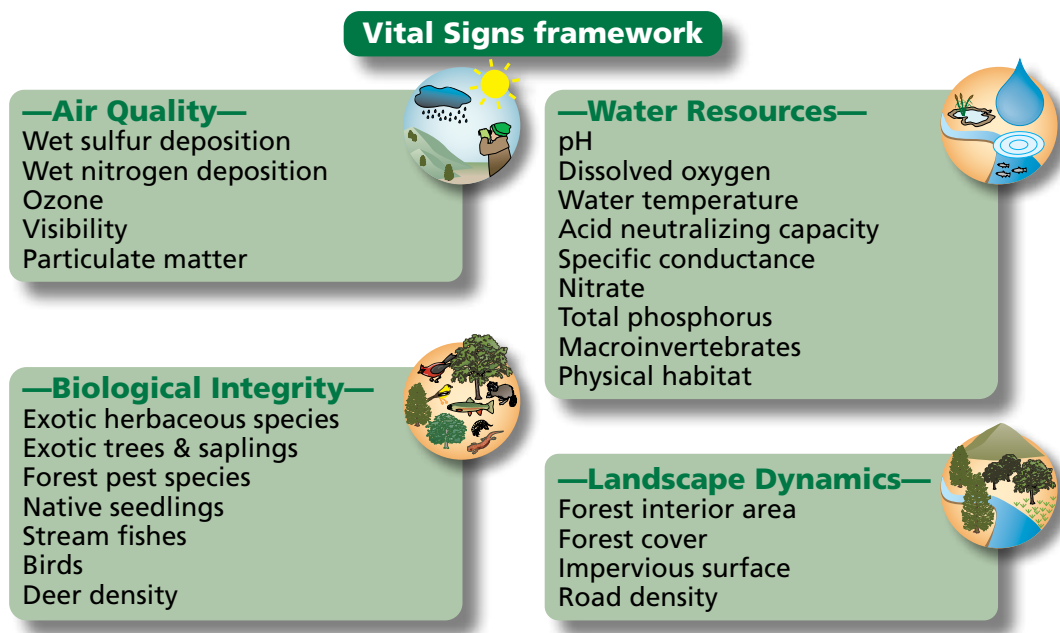


Natural Resource Condition Assessments (NRCAs) evaluate the current condition of a subset of natural resources and resource indicators in a national park. This brief summarizes the findings of the 2013 NRCA for Harpers Ferry National Historical Park.

### Natural resources in Harpers Ferry National Historical Park are in degraded condition overall.

A vital signs framework was used to assess natural resource conditions within Harpers Ferry National Historical Park. Within each vital sign, we identified indicators like ozone levels, stream water pH, and the number of native tree seedlings present, and sourced related data. We established reference conditions for each indicator and calculated their percentage

attainment of reference condition. A score for each vital sign category (air quality, biological integrity, water resources, and landscape dynamics) was calculated by averaging indicator scores in that category. We then averaged vital sign categories to calculate an overall park assessment. Based on key vital sign findings, management recommendations were developed and data gaps were identified.



Natural resource condition assessment of Harpers Ferry National Historical Park.

Vital Sign	Reference condition attainment	Current condition
Air Quality	6.6%	Very degraded
Water Resources	58%	Moderate
Biological Integrity	37%	Degraded
Landscape Dynamics	54%	Moderate
<b>Harpers Ferry National Historical Park</b>	<b>39%</b>	<b>Degraded</b>

## KEY FINDINGS AND RECOMMENDATIONS

### **Overall, the natural resources of Harpers Ferry National Historical Park were in degraded condition.**

The vital signs framework showed that air quality condition was generally very degraded, water resources condition was moderate, biological integrity condition was variable but degraded overall, and landscape dynamics condition was generally moderate.

#### ***Air Quality***

Air quality was in a very degraded condition. Degraded air quality is a problem throughout the eastern United States, the causes of which are out of the park's control. The specific implications to the habitats and species in the park are less well known. Gaining a better understanding of how reduced air quality is impacting sensitive habitats and species within the park would help prioritize management efforts. Air quality is measured and interpolated on regional and national scales. Implementation of park-scale air quality monitoring would give better insights into park-level air quality condition and possible effects on park habitats and species.

The close connection between climate and air quality is reflected in the impacts of climate change on air pollution levels. In particular, the U.S. EPA has concluded that climate change could increase ozone concentrations and change amounts of particle pollution.

#### ***Water Resources***

Water resources were in a moderate condition overall, with 58% attainment of reference conditions. Nutrients (nitrogen and phosphorus), specific conductance, and the Benthic Index of Biotic Integrity (BIBI) were in poor to very degraded condition while pH, dissolved oxygen, water temperature and acid neutralizing capacity were in very good condition, similar to results found in parks throughout the region.

Water quality is only measured at one site within the park, so it is recommended to expand monitoring to include sites in Elk Run and Piney Run. These streams do not originate in the park and only run through the park for a short distance but it would be informative to monitor what is coming through the park from upstream. Data gaps and research recommendations revolve around maintaining good water quality by identification of nutrient sources and sensitive organisms.

Water temperature increase is one of the most immediate threats from climate change, and this

would result in the loss of fish and other organisms that depend upon cooler water.

#### ***Biological Integrity***

Biological integrity was in a degraded condition overall, with 37% attainment of reference conditions. Deer density and the seedling stocking index were both in very degraded condition. Studies show a relationship between high deer density and poor forest regeneration and as such, deer management should continue to be a top priority. Other monitoring recommendations include exotic species monitoring and education, and continuing to monitor pests and diseases. Data gaps and research needs include developing a bird index for non-forest species and modeling the effects of climate change and other stressors on the region's forests.

How climate change may affect the park's resources and habitats should be an ongoing research focus, in particular how it might affect the introduction and spread of exotic species and forest pests and diseases.

#### ***Landscape Dynamics***

Landscape dynamics were in a moderate condition overall, with 54% attainment of reference conditions. Impervious surface at both spatial scales was in very good condition, as was forest cover within the park. Forest interior area within the park was in good condition, and was in moderate condition at the 5x park area scale. Road density was in very degraded condition at both spatial scales. The amount of forest cover and interior area within the park are influenced by the leased agricultural lands and developed areas within the park boundary. At the larger spatial scale, the proximity of the towns of Harpers Ferry and Bolivar, as well as developments to the south-west of the park, affects all of the landscape dynamics metrics.

Research needs for the park mostly relate to its function as a habitat corridor in the region. How climate change may affect the park's resources and habitats should be an ongoing research focus.

## CONCLUSIONS

Natural resources in Harpers Ferry National Historical Park are in degraded condition overall and are under threat from surrounding land use, regionally poor air quality, and overpopulation of deer. Climate change is predicted to negatively affect many of the natural resources of the park, including increasing ozone levels and particle pollution, raising the water temperature of cold-water, trout-supporting streams, changing forest composition, and affecting exotic species and forest pests and diseases.



For more information, please visit the Park's Visitor Center or call (304) 535-6029.

Harpers Ferry National Historical Park  
National Park Service  
[www.nps.gov/hafe](http://www.nps.gov/hafe)

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